Overview of NASA's Earth Observatory

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With contributions from

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Outline

- **Terra Outreach Strategy**
- **The Web as pre-eminent communications medium of choice**
- **Brief tour of the Earth Observatory**
- **Status report on first-year activities & progress**
- **Quantitative & qualitative feedback**
  - Statistics, Survey results, Review Panel feedback, & anecdotal feedback
- **Development plans & ideas going into our second year**
- **Other relevant activities; e.g., Earth Visualizations Database**
- **Funding support requirements**

Terra PSO's Outreach Strategy

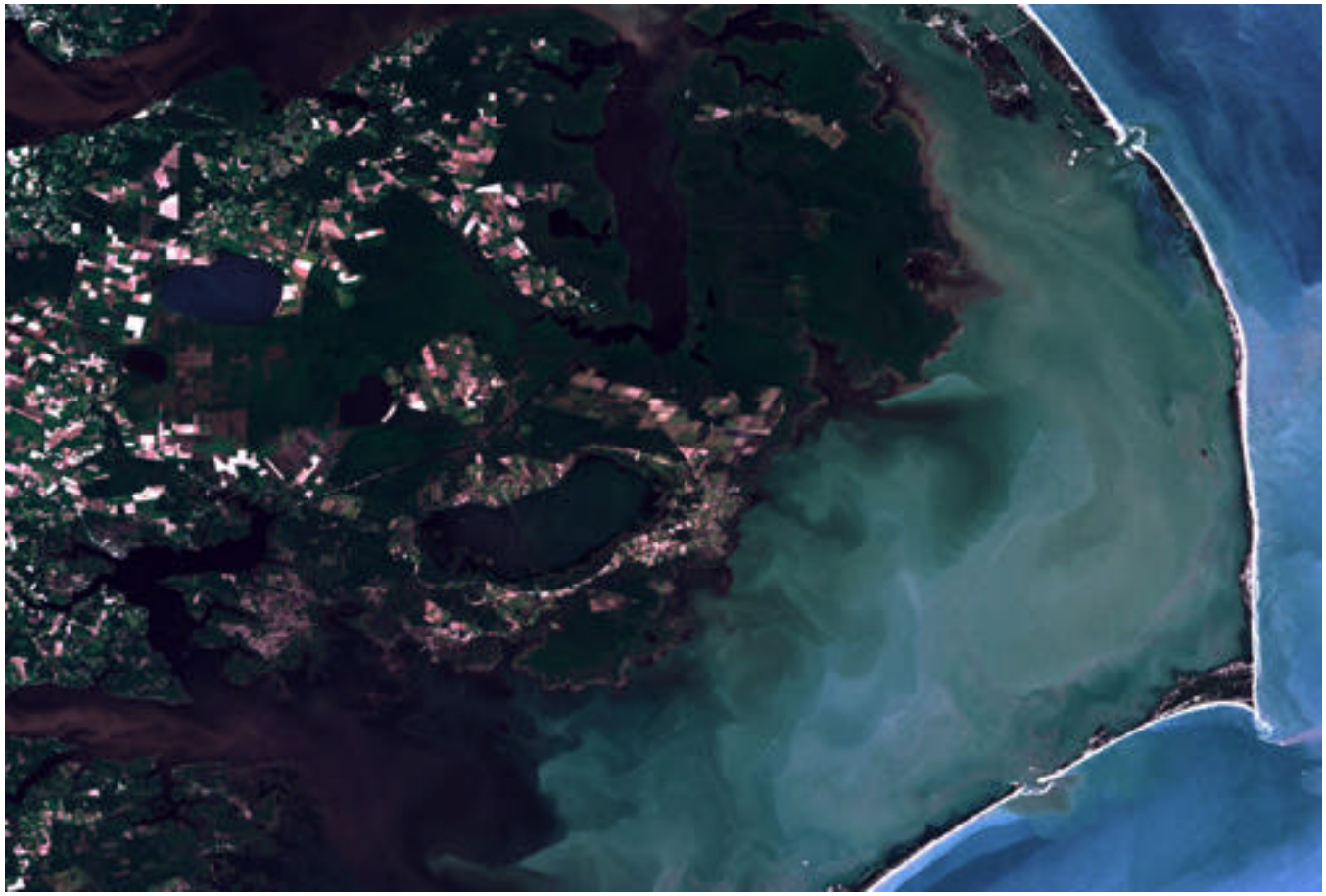
- **Web Pages (with emphasis on the Earth Observatory)**
- **Rapid Response (B. Montgomery)**
  - Generate near-daily summary reports of Earth events (e.g., floods, fires, etc.)
  - Limited success so far due to very limited access to timely data
  - Currently developing capability along 3 parallel paths to process Level 0 data outside the "normal" data stream:
    - » Processing software being installed on B. Montgomery's desktop
    - » Level 0 processing software accessible in Pat Coronado's facility
    - » Chris Lynnes will provide access to a machine in the GDAAC
  - Success stories so far (play on major news media) include:
    - » Landsat 7 images of Hurricane Floyd floods in North Carolina
    - » Landsat 7 images of Los Alamos fire in New Mexico
    - » Contributed to Terra first press conference (of course, this was a large group effort)
- **Executive Committee for Science Outreach (ECSO)**
  - Objective is to provide the focus, sets the priorities, & reviews the outreach materials produced for content & accuracy

Rapid Response Success Stories

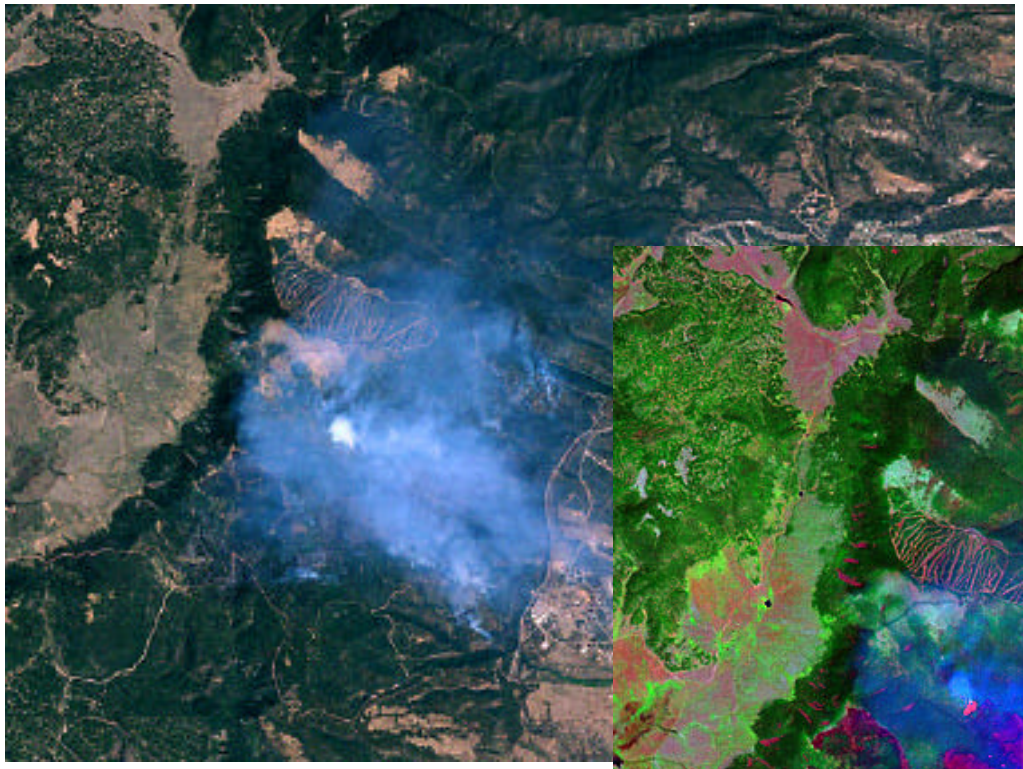
Floyd Floods in N. Carolina

Sept. 19, 1999

Landsat 7



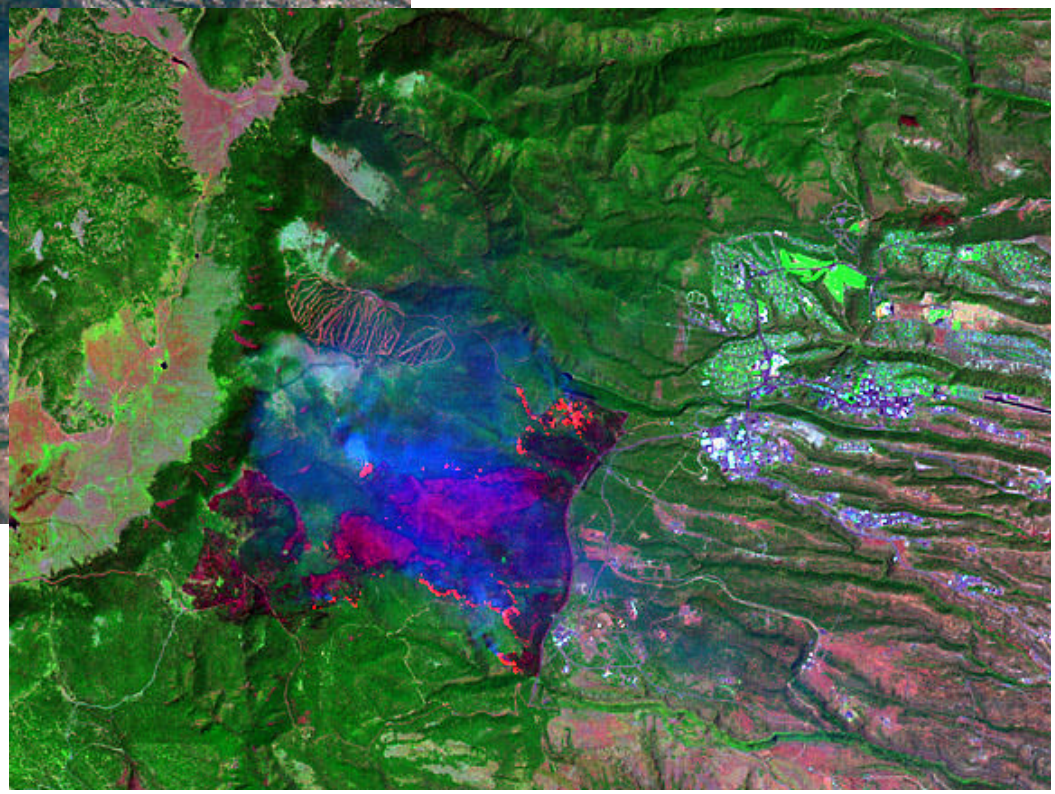
Rapid Response Success Stories



Los Alamos, NM

May 9, 2000

Landsat 7

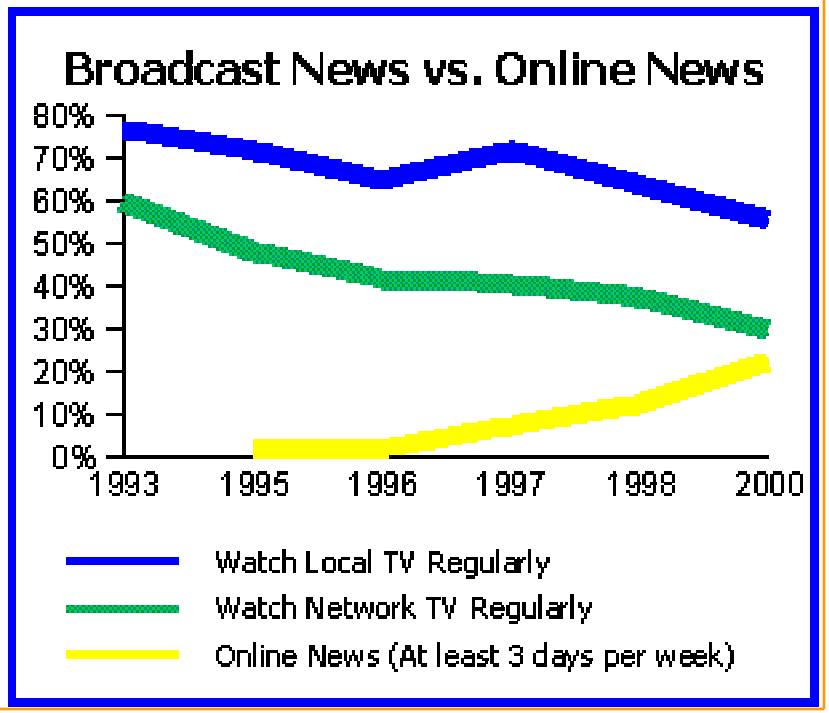


- Turned around these images in 2 days
- Played in major TV & Web media outlets

About the Web

- **According to the Pew Research Center (June 11, 2000)[1]:**
  - Only 55% of Americans watched TV news yesterday; down from 74% in 1994
  - Americans spend *less time* watching TV news today; younger audiences both watch it less frequently and spend less time watching it
  - Newspaper readership has leveled off; 46% read one yesterday
  - 27% who get news online say they follow science & technology news very closely; compared to 14% off-line
  - 63% use the Internet to get updates on science and health, and 59% get tech. news, & 66% for weather news on-line

"The same demographic groups which are moving away from the nightly network news in the greatest numbers are some of the very same groups which are moving toward online news use at the highest rates — more affluent, more well-educated Americans."



1) http://www.people-press.org

About the Web

- **The Web is quickly becoming the pre-eminent medium for mass communications "direct to information consumers"**
  - Blends the best aspects of TV & print media into digital, interactive medium (Earth Observatory is a "living, interactive document")
  - Network access speeds are accelerating 50% every year; trend to continue [1]
    - » 56 Kbps modem access is *today's* recommended optimum [1]
  - Home usage is climbing at a rapid rate
    - » Worldwide, from 26 million in 1995 to 150 million in 1998 to 304 million as of March 2000 [2]
    - » Projected to reach anywhere from 350 million to 1 billion users worldwide by 2005 [2,3]
    - » In the U.S. & Canada, about 137 million folks use the Web as of March 2000 [2]
    - » In the U.S., 81.3% access the Web from home every day (94% weekly) [4]

1) Nielsen, Jakob, 2000: *Designing Web Usability*
2) http://www.nua.ie
3) http://www.nua.ie/surveys/analysis/weekly_editorial.html
4) http://www.gvu.gatech.edu

About the Web

- As of February 1999, 87 percent of print journalists worldwide were connected to the Internet [1]

- **On Oct 13, 1999, Arbitron NewMedia reported that use of the Internet does not affect consumption of traditional media** [2]
  - Cited another survey that found that "less than 2% of people with home Internet access spend less time watching TV." [2]

- **<u>Conclusion</u> - Adopt an outreach strategy of synergy between traditional media markets & the Web**
  - At MSFC, 70% of NASA TV live shots were derived from "direct to consumer" (or "D2C") communications [3]
  - At MSFC, D2C increased science presence in public media by factor of > 5 [3]

- **<u>Recommendation</u> - Make the Earth Observatory the EOS Project's spearhead in its overall outreach strategy from which other media can easily leverage**
  - Scale & scope our effort to serve all of EOS

1) http://new-website.openmarket.com/intindex/99-02.htm
2) http://www.nua.ie/surveys/analysis/weekly_editorial.html
3) Horack, John M., et al., 2000: "NASA GSFC External Web Review Final Report Presentation (see Attachments 1 & 2)

NASA's Earth Observatory

Goals

- Teach public about climate & environmental change issues studied by NASA & affiliated agencies & institutions
- Feature presentations on NASA satellites, satellite imagery, interesting & innovative uses of remote sensing data, & new science results
- Stimulate interest & awareness of how remote sensing data is useful outside of pure scientific research
- Present Earth system science as a human endeavor that is important, interesting, worthy of funding, and (for students) an exciting career option

Objectives

- Provide NASA with an infrastructure & gateway for "direct to consumer" communications — we fill a void by covering remote sensing and complex climate & environmental change issues NOT covered comprehensively & in-depth by any other popular medium
- Provide timely materials, as well as story ideas, for use by public media in coverage of global change issues (includes TV, print media, other web sites, museums, etc.)
- Provide interactive tools useful to educators & students that help them learn the basics on how to access & manipulate remote sensing data
- Provide interactive resources that teach about "cause-and-effect" relationships w/in the Earth's climate system
- Provide cross-mission, cross-center, and cross-agency collaborations via weekly telecons

Who owns the Earth Observatory?

- **NASA's Earth science community has ownership**
  - The EO is a NASA portal that presents info about Earth — and the use of Satellites to study it — using language, images, an interface, and technology that the public can readily access & understand
  - Contributions to its success mainly from the EOS Project; with contributions from Goddard DAAC; NSIDC DAAC; GSFC, JPL, & LaRC PAO; Goddard SVS; and the University of Montana
  - Yoram Kaufman & Michael King, EOS Project Science Office, are the "responsible NASA officials"
  - Mainly, we seek to work around inter-center & inter-project foci & present info about the Earth the way the public is most likely to look for it
- **The Earth Observatory Team seeks to maintain a common look & feel, as well as a certain standard for how information is presented**
- **The site is overseen by the ECSO, along with Darrel Williams & Claire Parkinson**
- **Rooms are managed & edited by specific persons among the aforementioned community**

Status Report on 1st-Year Activities

- ***Front Page & General Interface Redesigns (R. Simmon & K. Ward)***
  - **Increased update frequency & revised front page to show this**
  - **Added "Image of the Day" (5 days per week)**
  - **Added more navigation vectors**
  - **Added new information resources**
- ***Data & Images (formerly "Observation Deck") (Simmon & Heney)***
  - **Most progress made in prototype phase; only 2 currently-updated global data sets (!) & those are done by hand**
  - **Goal is remain current in most of Earth's vital signs, updated every month in automated fashion**
  - **Fixed animation "bug"; scoped table redesign, will implement soon**
- ***Features (formerly "Study") (Herring, Varani, Weier, Simmon)***
  - **Added global map for visual navigation**
  - **Increased frequency, usually 2 per week**
  - **Responded to Chris Scolese's challenge of "making the stories relevant to the person on the street"**

Status Report on 1st-Year Activities

- ***Features (continued)***
  - **Published 60 feature articles to date — 24 internally written & produced, 34 contributed by DAACs, & 2 submitted by scientists**
- ***Newsroom (S. Cole, E. Lorditch, & K. Ward)***
  - **Improved timeliness of NASA press releases to same time, same day**
  - **Added new Media Resources (e.g., *Science Writer's Guide to Terra*)**
  - **Added new field research updates**
- ***Reference (formerly "Library") (S. Graham & R. Simmon)***
  - **Added Glossary of Terms**
  - **Added "On the Shoulders of Giants" monthly series**
  - **Added 24 fact sheets, 17 newly-produced or revised extensively**
- ***Missions (formerly "Mission Control") (M. Heney)***
  - **Added MODIS Direct Broadcast image**
  - **Added spacecraft overpass predictions**
  - **Added pointer to MSFC J-Track tracking facility**

Status Report on 1st-Year Activities

- ***Experiments (formerly "Laboratory") (M. Syvertson & S. Stockman)***
  - **Virtually no development in this room**
  - **Point to Russ Wright's *Earth Events Based Learning Modules***
  - **Selected L7 scenes to add to image compositer (awaiting implementation)**
  - **Mentored 4 teacher summer interns to scope land biosphere interactive model; activity scoped but remains in limbo**

1st Year Site Statistics

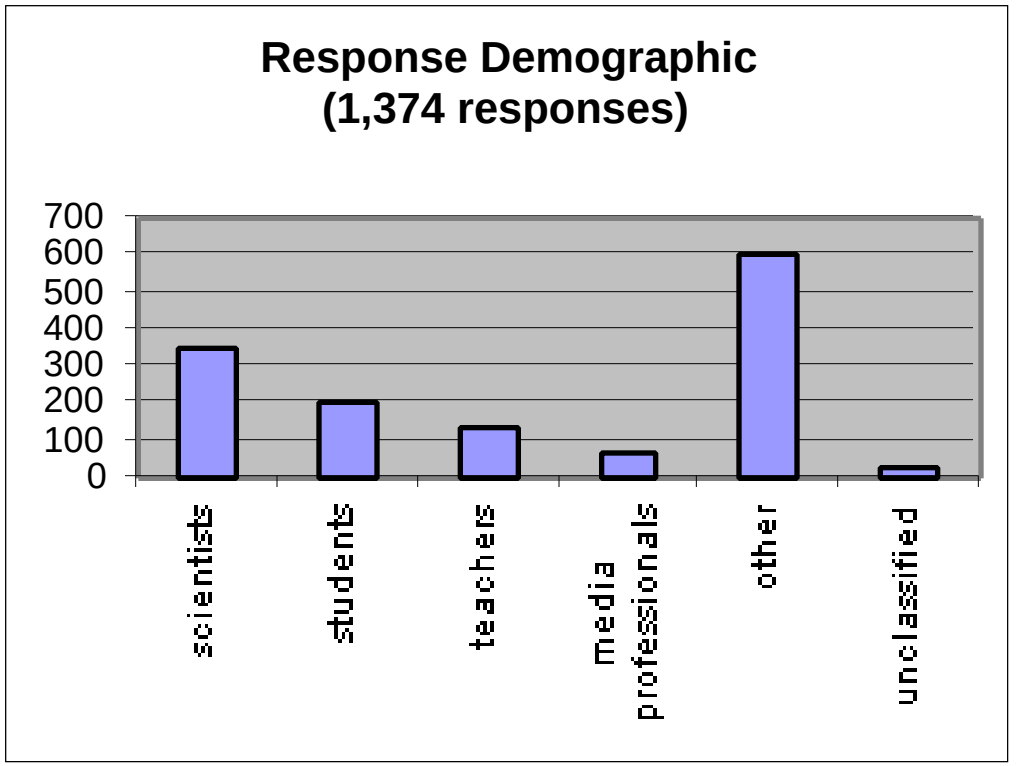
- ***First published April 29, 1999***
- ***Total page views in 1 year: 4,130,222 (~ 11,315 per day)***
  - *Page views in May 2000: 267,803 (~ 8,639 per day)*
- ***Total QTVR data sets requested: 209,131 (~ 573 per day)***
  - *QTVRs requested in May 2000: 6,536 (~ 211 per day)*
- ***Total subscribers: 9,254 (~ 23 per day)***
  - *New subscribers in May 2000: 234 (~ 8 per day)*

EO Site Survey Results

(see* http://earthobservatory.nasa.gov/Internal/UserSurvey*)

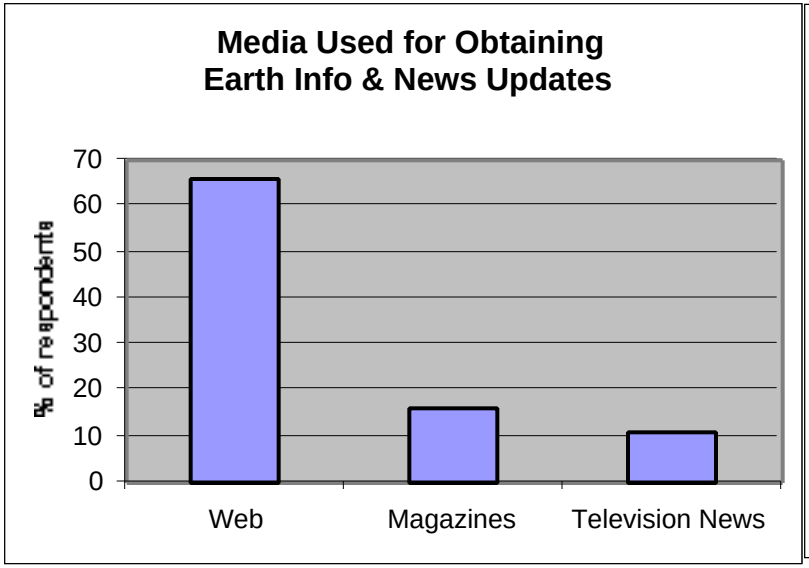
- **From May 11 - 31, 2000, we surveyed our site subscribers (~9,200) and received 1,374 responses (~ 15 percent)**

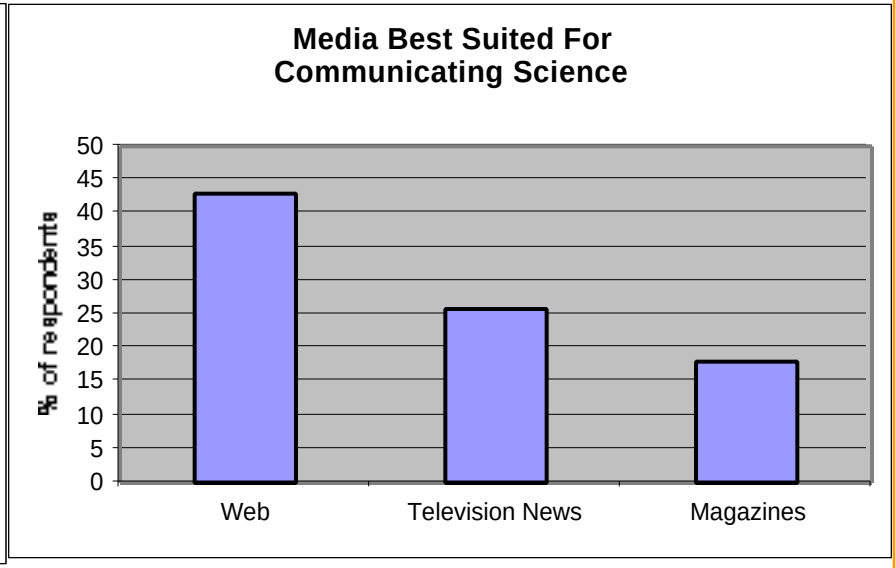
  - 347 (25%) were scientists
  - 203 (15%) were students
  - 134 (10%) were teachers
  - 65 (5%) were media professionals
  - 599 (43%) classified themselves as "other"
  - 26 (2%) were unclassified [or lost in transition ?]



EO Site Survey Results

- **Comparing communications media**
  - The majority of (66%) our subscribers visit the Web most often for Earth info & news updates, followed by Magazines (16%) & Television news (11%)
  - The Web (43%) rated as the medium best suited for communicating science to the lay public, followed by Television news (26%) & Magazines (18%)





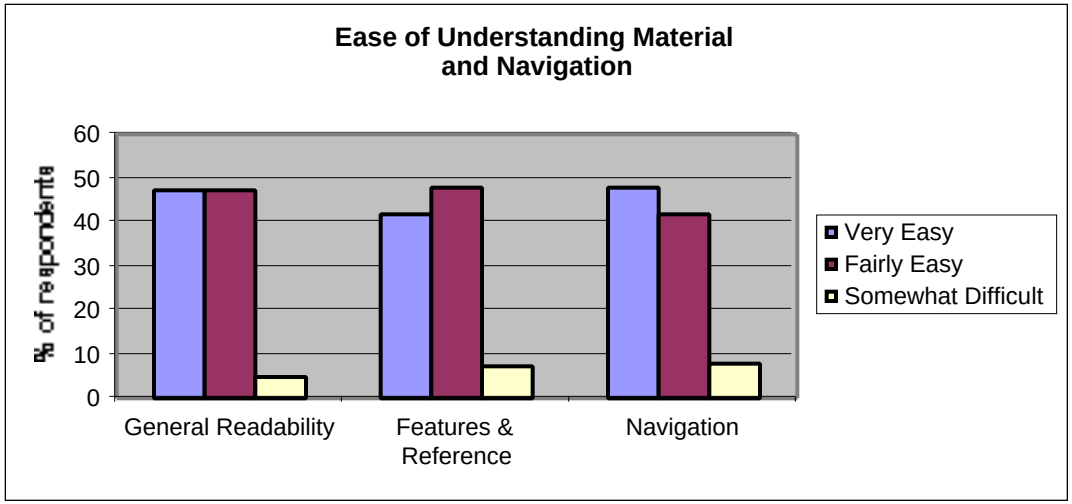
EO Site Survey Results

- **Rank the rooms**
  - Overwhelmingly, folks ranked the Images & Data section (50%) as their favorite, followed by the Newsroom (21%), the Features (12%), Mission Control (5%), Experiments (4%), and Reference (3%)
- **How often do our subscribers visit the site?**
  - A significant number visit daily (~10%) and more than half visit weekly (53%); about one-third (31%) visit once or twice per month
  - This means that only about one-sixth to one-tenth of our daily visitors are subscribers to the site, most come to our site via other means
- **Which rooms do visitors feel need more development?**
  - Overwhelmingly, Images & Data was the favorite, followed by #2 - Newsroom, #3 - Features, #4 - Experiments, #5 - Mission Control, #6 - References
- **What type of content would bring visitors back to the EO?**
  - "More images" said 27%; 8% said "No changes are needed"
  - 55% selected "Other," but *there were no surprises*
    - » Most of these fell into "more images" & "more of same" categories
    - » Some suggested creating multi-language versions of the site; adding more images & info outside the USA; & building more links

EO Site Survey Results

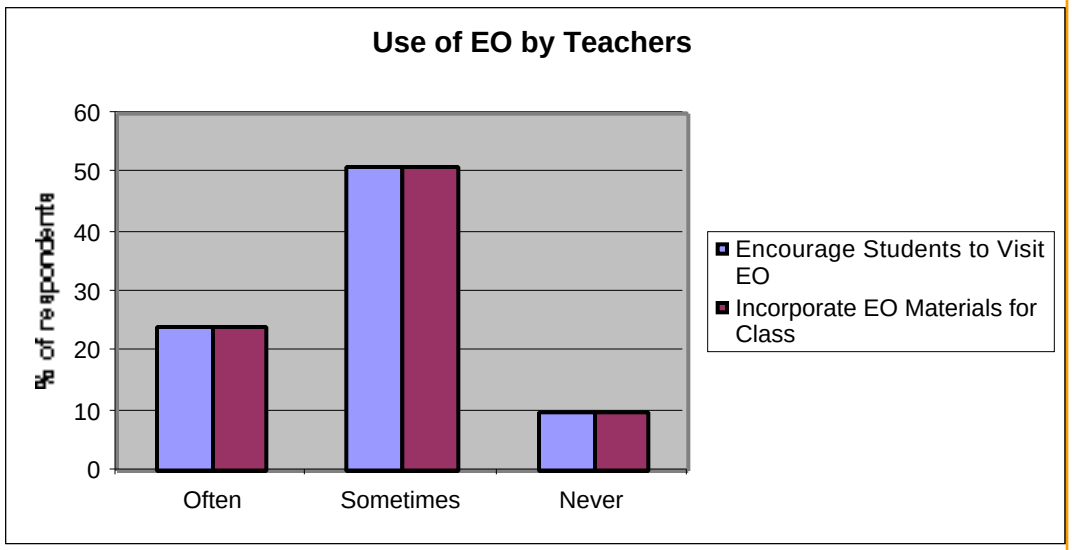
- **How easy is it to understand materials in the Earth Observatory?**
  - "Very easy" said 47%, and another 47% said "Fairly easy"; less than 5% rated it "Somewhat difficult"
  - Ditto for the feature & reference articles — 42% said "Very easy" and 48% said "Fairly easy"; 7% rated them "Somewhat difficult"
- **How easy is it to navigate around the site?**

-- "Very easy" said 48%, and another 42% said "Fairly easy"; 8% rated the EO as "Somewhat difficult" to navigate



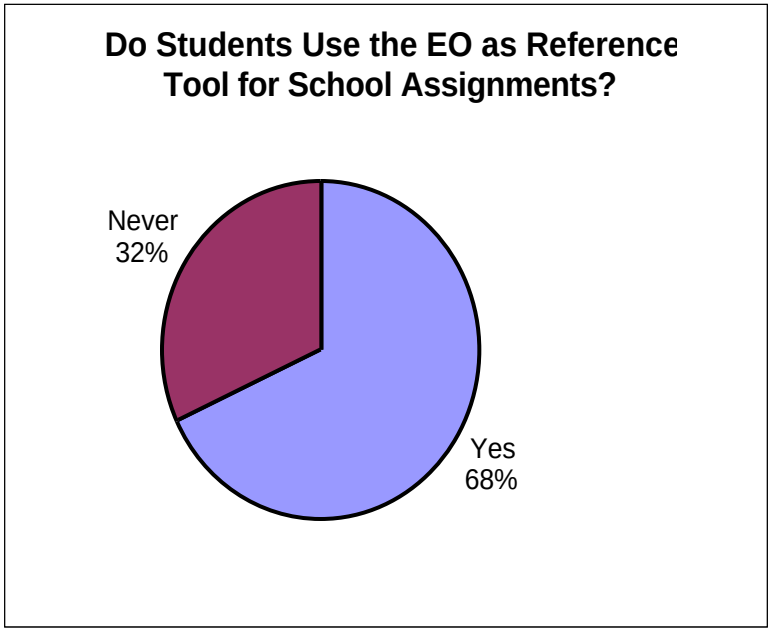
EO Site Survey Results

- **Teacher Feedback (134 respondents)**
  - 43% were undergraduate or higher, 37% were 9 - 12 grades, 16% were 6 - 8 grades — 80% at middle school & up is commensurate w / our strategy
  - 74% of respondents teach Earth science or related course(s)
  - By far, most of our respondents encourage their students to visit the EO — 24% said “Often” and 51% said “Sometimes”; less than 10% said “Never”
  - Most of our respondents incorporate materials from the EO into their classroom lessons — 24% said “Often” & 51% said “Sometimes”; less than 10% said “Never”
  - Teachers primarily use the Experiments (28%), Images & Data (23%), & Features (21%) sections



EO Site Survey Results

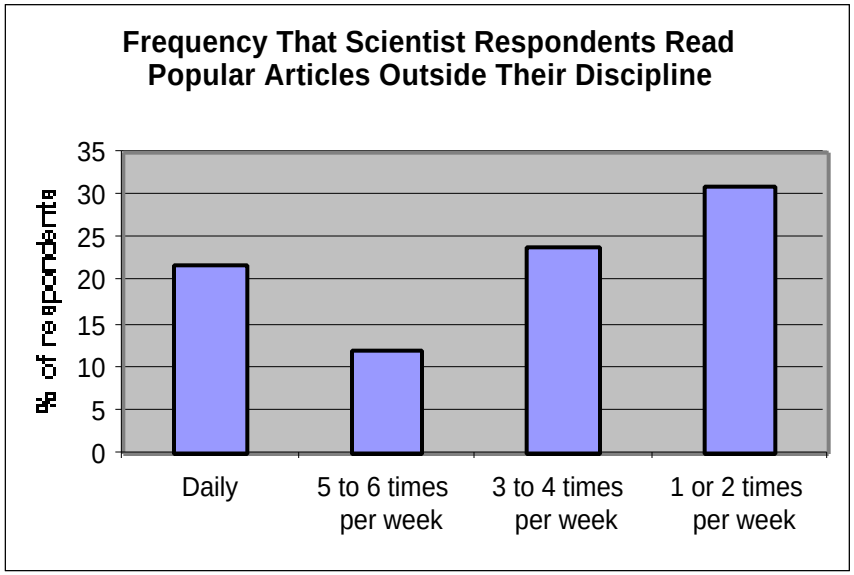
- **Student Feedback (203 respondents)**
  - 77% were undergraduate or higher, 15% were grades 9 - 12, and 8% were grades K - 8
  - Interestingly, 81% said their teachers “Never” encouraged them to visit the EO
  - Students (68% of respondents) have used the EO as a reference tool when doing schoolwork assignments, while 32% have “Never”



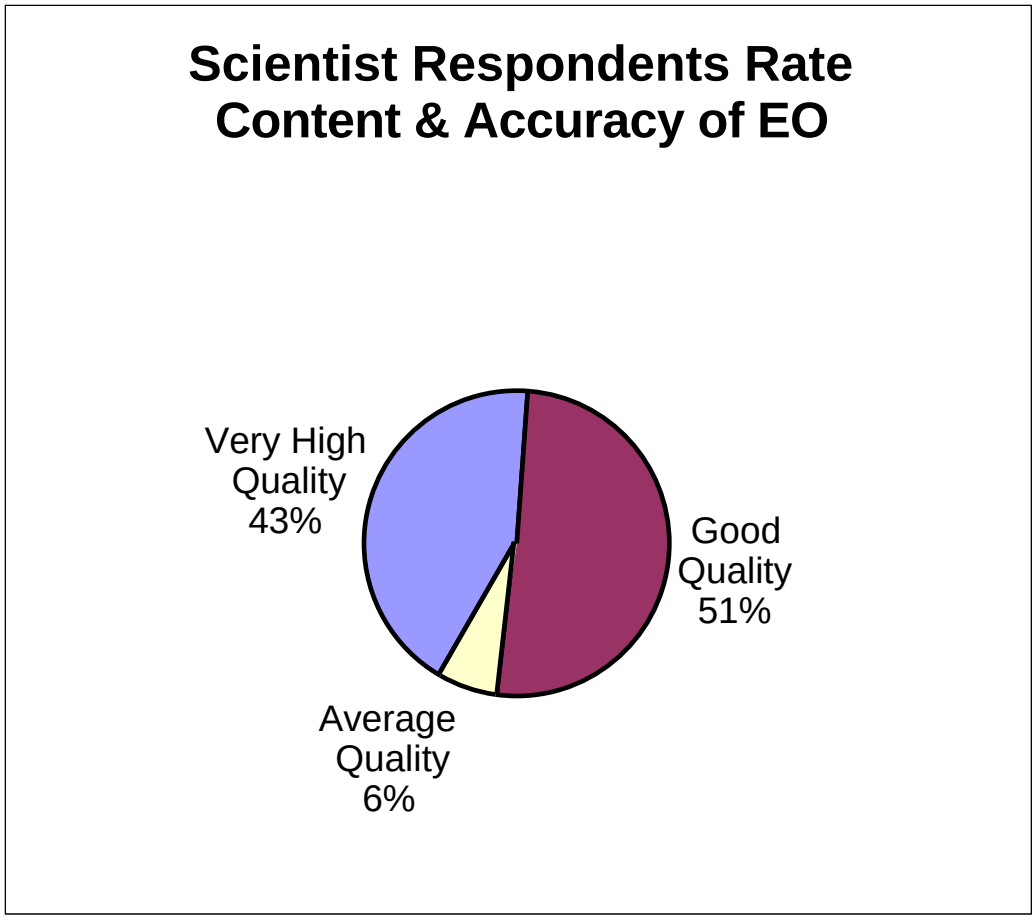
EO Site Survey Results

❑ Scientists' Feedback (347 respondents)

- Scientists read popular articles outside their disciplines quite frequently — 22% said "Daily," 12% said "5 to 6 times per week," 24% said" 3 to 4 times per week," and 31% said "1 or 2 times per week"
- Overwhelmingly, our respondents feel it is important to communicate science results to the lay public — 25% feel it is "Critical," 43% feel it is "Very important," and 24% feel it is "Somewhat important"
- Many respondents (47%) consider the EO as a viable medium for publication; 32% weren't sure; & 21% said "No"



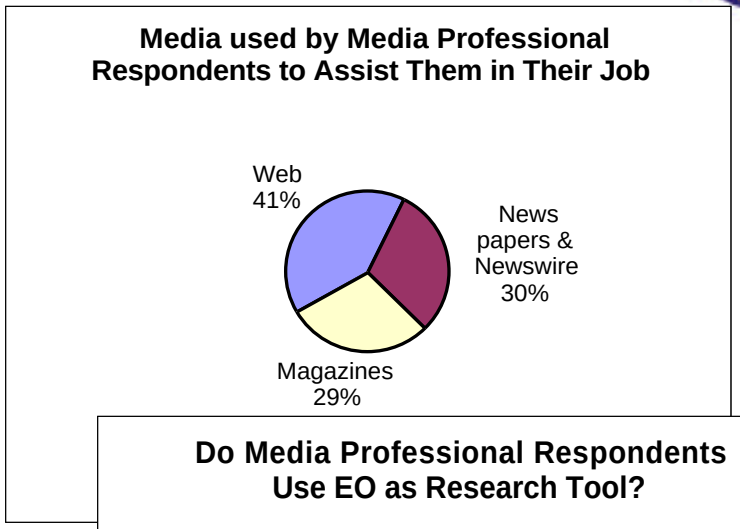
EO Site Survey Results

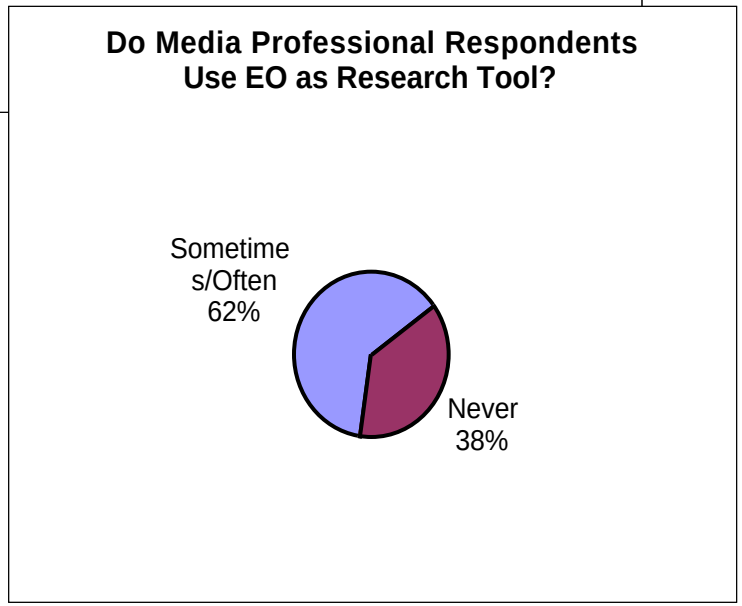


- **Overwhelmingly, the EO is regarded favorably by the scientists who responded to our survey — 43% rated it "Very high quality" and another 51% rated it "Good quality"**

EO Site Survey Results

- **Media Professionals' Feedback (65 respondents)**
  - Most respondents work for Web sites (28%) and Magazines (20%); some work for newspapers or wire services (12%) and some for TV (11%), while 29% listed themselves as "Other"
  - Most respondents use the Web (311 weighted score) when seeking info to assist them in their jobs, followed by newspapers and newswire services (228), and magazines (221)
  - Almost two-thirds of respondents use the EO as a research tool when writing about global change — 18% said "Often" and 44% said "Sometimes"





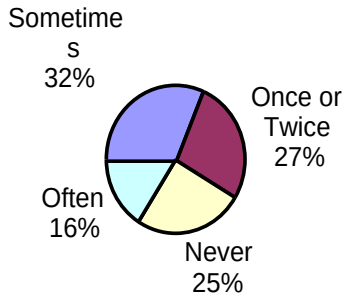
EO Site Survey Results

– Most Media Professionals who responded publish info on climate &/or environmental change — 9% said "All the time," 19% said Often," and 32% said "Sometimes"; 40% said "Never"

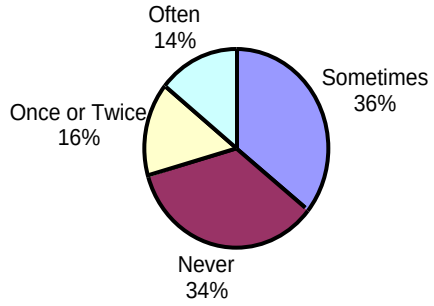
– Most respondents get story ideas from the EO — 16% said "Often," 32% said "Sometimes"; about one-fourth said "Never"

– Interestingly, most respondents actually use materials from the EO in their publications — 14% said "Often" and 36% said "Sometimes"; 34% said "Never"

Have Media Professional Respondents Found Story Ideas in EO?



Have Media Professional Respondents Used EO Materials in Their Publications?



EO Site Survey Results

- **"Others' " Feedback (599 respondents)**
  - The largest percentage of respondents classified themselves as "other," which suggests we are reaching the "general public"
  - By far, most of these respondents found our site linked from another NASA page (62%), while another 15% stumbled upon it surfing
  - Overwhelmingly (97%), folks said they would come back
  - Overwhelmingly (97%), they said the topics presented are extremely to somewhat relevant to their lives
  - Similar numbers (97%) said satellite data are relevant to their lives
  - In the comments, many advocated "More links to other sites"
    - » We plan to actively begin building links to other excellent NASA outreach sites related to Earth science, data, & Earth observing satellites

Qualitative Feedback

Public Media & Organizations

- Featured in *Science* magazine in 1st week after publication
- Selected by *Popular Science* among "50 Hottest Sci & Tech" web sites, September 1999; listed first among those focused on the Earth
- Selected as "Distinguished" & "Best of Show" by Society for Technical Communication (STC) in Washington, D.C., region Online Communication Competition
- Selected as "Distinguished" in STC's International Online Communication Competition

Anecdotal

- "What a gorgeous and well-executed website! It's always a kick to get one of those e-mail updates from Kevin Ward--I'm now trained to expect all kinds of great new content each week. … Great lahars story ... So good, in fact, that you inspired me to convince my colleagues that I should write something similar for our news section." — Sarah Simpson, *Scientific American*
- "It is rare to be moved by a website but I am by this one. Fantastic work. Regards." — James Hutson, Editorial Producer, Beyond2000.com

Qualitative Feedback

- **"Dear Kevin thanks so much for allowing me and my students to use this website, it is the best of the best!! I use it in my geology classes. What a resource!!" — Tibi Marin, Geology Professor, Kansas State University**
- **"Thank you so much for your earth observatory updates; I am the Science Fair coordinator at our school, and I am using them to gear up our families for this year's fair. It is such a thrill to get them, and to pass the information along to the students…." — Marcella Ketelhut, Trinity Pacific Christian School**
- **"I just wanted to let you know how impressed I am with this web page. It is a wealth of information I will mine for my classes. This is great example of what government does best. Thanks for all of your work." — Landon Neustadt, Laguna Blanca School**
- **"I teach a remote sensing course at the US Coast Guard Academy, and the Earth Observatory has had a very big impact on my course this semester. It allows me to bring in recent, relevant information into my classroom while at the same time saving me countless hours of time researching these topics. I also forward many of the articles to other instructors who use it in their classrooms. So, your e-mail service really does provide an important service to teachers such as myself … and as such they are having an impact on our students." — CDR Michael Alfultis, U.S. Coast Guard Academy**

Qualitative Feedback

***(see* http://achilles.gsfc.nasa.gov/cgi-bin/WEBEVAL/EvalHomeE.pl)**

- **From Dr. John M. Horack, Chair, GSFC External Review Panel:**
  - **"We believe that the Earth Science environment at GSFC would benefit greatly from the existence of a portal site for Earth Science research. … Updated daily, this high-performance site would serve as the flagship for Earth Science research at GSFC, containing research news, information, and programming for the science attentive audience. The site would serve as a primary funnel for customers to additional sites at GSFC that deal with more specific or narrowly focused information … *EarthObservatory* is the closest to such a configuration. Moving earthobservatory.nasa.gov in this direction would require daily information updates to the site, greater connectivity to the Earth Science web resources, and a common thematic appearance to the level of three clicks deep."**
  - **"A robust science communications activity focused on practice, research, and education can be built for around $750K each year, in full cost. Institutionally, it can be organized much as one would build a research department at a university or laboratory."**
  - **"The external environment is changing however, and NASA's communications infrastructure must recognize this change. While their need and desire for scientific information has increased, consumers of scientific and technical information are using mediated communications channels ever more infrequently, and are 'bypassing' the middle man in the mediated link. Therefore the panel recommends that GSFC examine the validity of current communications success-criteria and very carefully consider how to communicate in 'direct to consumer' modes."**

Qualitative Feedback

- **From Dr. John M. Horack, Chair, GSFC External Review Panel:**
  - *General Feedback:* The site has a good, crisp, and clean look. URL is among the best of the lot that we examined. Hard to distinguish between the "Study" and the "Library." The overall strategic design is a strength. Mixed response to the interactive table of contents feature. Minimal links to "experts" or where to find a human if I have a question.
  - *Five Things:*
    - » On the front page add indications of change, when the content was last modified. Make it explicitly clear that the features change weekly.
    - » The data sets are two years old. Can they be updated? Provide a minimal explanation of why these data sets are interesting or useful
    - » Provide a link to overall NASA Earth Science page
    - » Think about linking to Spacelink or the overall NASA Education Page from the "Laboratory" section
    - » Move the link of the section that you are in — for example "Study" to the top of the list in the interactive directory, instead of at the bottom as it is currently

Summary of Plans for Our 2nd Year

New

- ❑ **Unveil Earth VizDB**
- ❑ **Add Earth Events Monitor pages**
- ❑ **Add news tips for journalists**
- ❑ **Add access to subsets of data with tools for manipulating**
- ❑ **Add interactive climate models**
- ❑ **Add print & fold global data sets (for schools)**
- ❑ **Scale up focus to include Aqua & EO-1; begin plans for Aura & SORCE**
- ❑ **Add Web tool for online reading plans for teachers; reports for students**

Ongoing

- ❑ **Add Terra, SeaWiFS, & TRMM monthly global composites**
- ❑ **Achieve Rapid Response goal of at least one news image per week**
- ❑ **Engage ECSO to set focus & priorities**

Plans for Our 2nd Year

❑ *Administrative Initiatives (K. Ward & D. Herring)*

- **Revise and routinely update the calendar of all assignments & development milestones — see**
  http://earthobservatory.nasa.gov:8080/Central/calendar
  - » Login: *eostaff*; Password: *ADEOSlives*
  - » Request that the ECSO take on greater responsibility to guide & review the site's development; we plan to revisit the ECSO member representation
- **Implement similar calendar for "Image of the Day" assignments**
- **Launch Earth Visualizations Database (VizDB)**
  - » We will strive for a superset collection of NASA (& affiliated) Earth images & animations that can be served up to our communication partners in up to 3 resolutions — thumbnail, screen size, & full resolution
  - » Fully Web accessible
  - » Image sources will control upload of captions & credit info

Plans for Our 2nd Year

- ***Front Page & General Interface Redesigns (K. Ward & R. Simmon)***
  - **Spotlight a different educational outreach site each week**
  - **Add button to cryosphere index page**
  - **Maintain pace of new image every day; preferably newsworthy (B. Montgomery & R. Simmon; others)**
  - **Add new row of buttons to Earth Events Monitor pages:**
    - » Fire -> hire grad assistant at UVa under Chris Justice
      - Would pick up where we left off w / Global Fire Monitoring page, which was listed as "One of 12 Key Accomplishments in 1998" by USGCRP in the 2000 edition of *Our Changing Planet*
    - » Flood -> grad asst. at Dartmouth under Bob Brakenridge
      - Already discussed this with Brakenridge — he is very interested
    - » Volcano -> grad asst. at U. Hawaii under Peter Mouginis-Mark
    - » Earthquakes -> grad asst. at USGS (or at EDC DAAC or under P. Lowman)
    - » Severe Storms -> grad asst. at NBC WeatherNet 4 under Dave Jones
    - » Droughts -> grad asst. at NASA GSFC (under Jim Tucker)
      - This activity is already underway, supported by M. King

Plans for Our 2nd Year

- ***Images & Data (A. Varani, R. Simmon, & M. Heney)***
  - **Transition to DAAC ownership of this section**
    - » Annette Varani, NSIDC, writing new document of scope
  - **Move to automated monthly updates of global data sets**
  - **Begin adding new Terra global data sets as they become available**
    - » Also, add current SeaWiFS, TRMM, & QuikScat global images
  - **Add higher res regional (continental & ocean scale) images monthly**
  - **Revisit & revise all data product descriptions to render easier to understand**
    - » Build links to relevant DAACs for those who want to order data
  - **Build bridges to other NASA sites, museums, & commercial Web sites (e.g., Discovery Online)**
    - » To reduce pull side demand for data, we will soon begin scoping solution for staging access to global & regional 8-day, 16-day, & monthly composite data that are of interest to myriad other outreach organizations

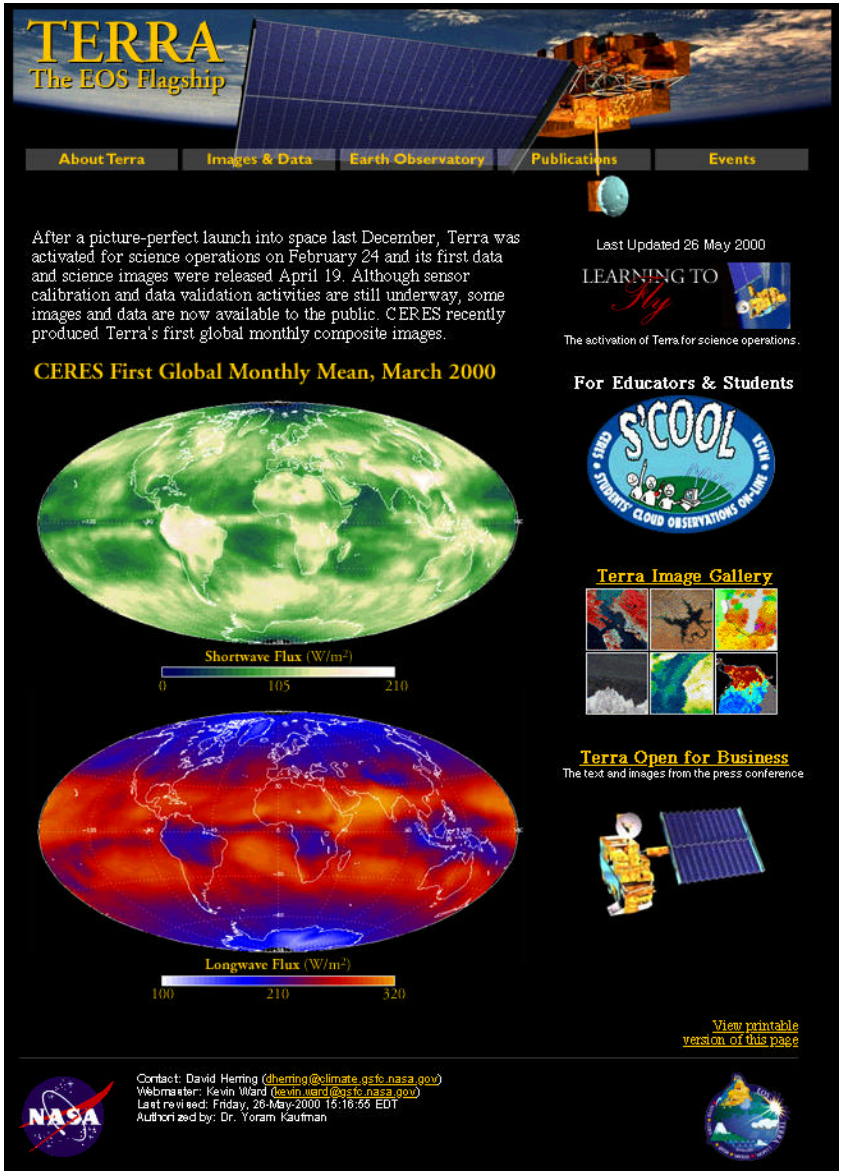
Plans for Our 2nd Year

- ***Newsroom (S. Cole)***
  - **Create "News Tips" service for journalists**
  - **Expand "Field Research" section**
- ***Features (D. Herring, J. Weier, & A. Varani)***
  - **Begin engaging the ECSO for story assignments on new Terra results**
  - **Strive to maintain story rate of 2 per week**
    - » Maintain balance b/t "abstract" climate articles & those that apply to the lay person
    - » Solicit & publish more articles from wider EOS community
- ***Reference (S. Graham)***
  - **Maintain current publication pace**
  - **Add new fact sheet series on Aqua mission & sensors; also EO-1 mission**
- ***Missions (M. Heney)***
  - **Upgrade MODIS direct broadcast image quality**
  - **Simplify Overpass Prediction tool interface**
  - **Build pointers to mission home pages & relevant DAAC sites**
  - **Add STK image for Terra; prepare for "live" display of Aqua launch**

Plans for Our 2nd Year

- ***Experiments (J. Kuglin & A. Philp, U. of Montana)***
  - **Recently transitioned to editorial direction of U. of Montana's EOS Outreach Center (see Attachment 3)**
    - » Now pursuing links w / ESRI & LizardTech to render available subsets of remote sensing data via freeware tools for Web access & manipulation
    - » Remote sensing assessments & educational activities focused on the Lewis & Clark Trail
    - » Developing guided hands-on activities for Teachers to use remote sensing data in the classroom
    - » Develop Land Biome interactive model
  - **Begin making links & storage infrastructure for serving up MODIS Direct Broadcast data subsets (providing access to *today's* data) — (Coronado, Herring, Heney, U. of Montana)**
  - **Elementary school "print & fold" global data sets — (Descloitres, EO teacher interns)**
  - **Implement tool for real-time creation of Web-based reading plans (teachers) & reports (students) — (K. Ward, EO teacher interns)**
  - **Add portions of SimEarth for global climate model activities (Maxis Corp. ?)**

http://terra.nasa.gov



http://earthobservatory.nasa.gov